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Accessory Heads of Anterior Belly of Digastric Muscle in Korea

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The digastric muscle has two bellies and it has various variation in submental region. During dissection of a 79-year-old Korean female cadaver, bilateral variations at the anterior belly (AB) of the digastric muscle in submental region were shown. Two accessory bellies originated medial to the origin of the two normal ABs of the digastric muscle. They run medially and combined each other anterior to the median raphe of the mylohyoid muscle. In left side, AB of the digastric muscle was divided into two muscular bellies. Therefore, five bellies of ABs of the digastric muscle were found. This novel variation has not been described in the literature and this appearance will guide clinicians during surgical interventions and radiological diagnosis.

Keywords: Anterior belly, Digastric muscle, Korea, Variation

Introduction

The digastric muscle includes two bellies. One of the bellies is called anterior belly (AB) of the digastric muscle. Another is posterior belly of the digastric muscle. It depends on the body of the mandible, and curved from the mastoid notch to the symphysis menti [1,2]. This muscle is the landmark in head and neck surgery.

Two bellies are different type of embryological and innervation [3,4]. The AB arises from the base of the mandible, is supplied by the trigeminal nerve (Cranial nerve V). However, the posterior belly originated from the mastoid notch which is on the temporal bone, is supplied by the facial nerve (Cranial nerve Ⅶ). Two bellies unite in an intermediate tendon which pierces the stylohyoid muscle and is linked with the side of the body and the greater cornu of the hyoid bone.

The variations of the digastric muscle are extremely frequent [5-9]. The posterior belly may be originated partly or entire from the styloid process. And, the posterior belly without AB may be inserted into the middle of the jaw or the hyoid bone. Usually, variations of the AB may pass to the jaw or mylohyoid muscle, or merge with a similar slip on the opposite side. Anatomic variations in the digastric muscles may affect diagnostic and therapeutic procedures in head and neck surgery; such abnormalities commonly occur in the submental triangle and have to be considered in imaging procedures of soft tissue masses and in operations involving this region [2].

In this report, we described a novel variation of the digastric muscle and discussed its surgical complications.

Case Report

During the course of an educational dissection, we found variations of the digastric muscle in the cadaver of a 79-year-old Korean female. The skin, subcutaneous tissue, superficial fascia, and platysma were removed carefully. In the submental region, unique variation of the digastric muscle was found and their origin, insertion, shape, blood supply, and innervation were also examined. We needed to see the muscle variation properly, so we cut the anatomical structure horizontally. The thyrohyoid membrane was cut to identify the submental region between third and fourth cervical vertebrae level.

In both side, we found five anterior bellies (AB) of the digastric muscle (Fig. 1). In right side, AB were originated from the digastric fossa of the mandible and passed downward normally. In left side, two heads of AB were originated from the digastric fossa and continued together. They were united as an intermediate tendon and passed downward and backward normally.

In addition, accessory ABs in both sides originated medial to the origin of the normal AB of the digastric muscle and continued medially. Both accessory ABs run from the lateral to the medial and merged at the median raphe of the mylohyoid muscle.

The accessory bellies were approximately 30 mm in length and 3 mm in width. Left two heads of anterior digastric muscle were 53 mm in length and 6 mm in width. The both side anterior and accessory bellies were innervated by the mylohyoid nerve. These muscles were supplied at the submental artery that is a branch of the facial artery.

Discussion

The digastric muscle has functions any complex jaw action such as speaking, swallowing, chewing and breathing. The moment the digastric muscle contracts, the hyoid bone is elevated. Many reports have described anomalies of AB of digastric muscle, with high frequency of occurrence [10-12]. Until then, variations were described in accordance with the classifications of Zlabek [3], which took into account their phylogenetic and ontogenetic development, the abnormal digastric muscles affect elevation the hyoid bone and open the mouth extremely or smallest. As above described clinical importance, many anatomists studied and classified the variation of this muscle [11]. Previous studies concerned about the frequency of accessory head of this muscle and classified their types, as crossover and unilateral type. Recent study in Korean population showed accessory belly in 23.5% (8/34) and this frequency was in agreement with other studied in different populations [7,8,11].

In accordance with these studies, accessory AB usually originated from the AB itself, the intermediate tendon, the hyoid bone, the mandible, and the digastric fossa. And the insertion parts included the mylohyoid raphe and even the mylohyoid muscle. However, bilateral variations of the digastric muscles are reported to be fewer than unilateral variations.

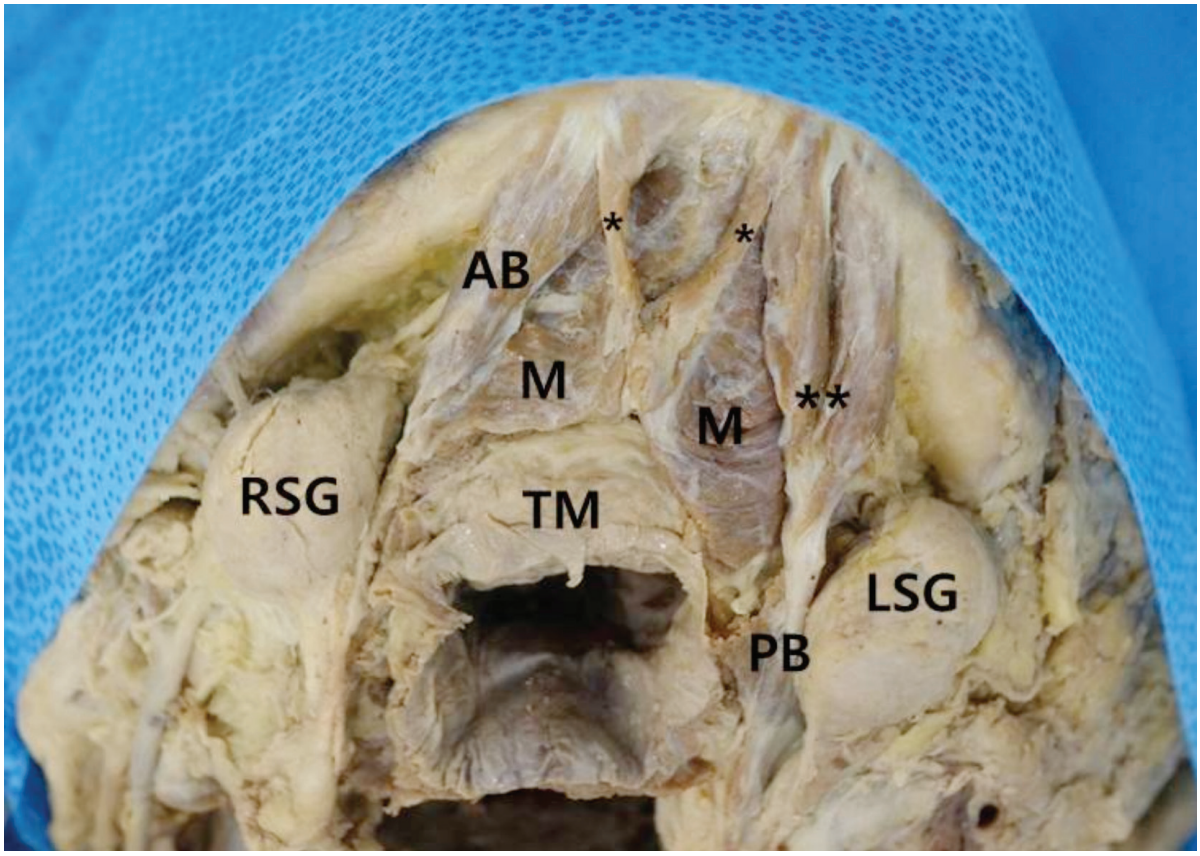

Fig. 1. View of the accessory bellies of the digastric muscle. Two accessory bellies (*) merge and some parts attach the mylohyoid raphe. Left anterior belly of digastric muscle has two heads (**). AB: anterior belly, PB: posterior belly, M: mylohyoid muscle, LSG: left submandibular gland, RSG: right submandibular gland, TM: thyrohyoid membrane.

Bergman [12] described that the mylohyoid and the AB if the digastric remain closely related. They usually exchange some fibers, sometimes resulting in complete fusion between the two muscles or in a digastric originating from the mylohyoid. Similarly, two accessory bellies inserted into the mylohyoid raphe in our case. However, left AB of the digastric muscle had two heads, therefore, these muscles were asymmetric. Therefore, this variation was bilateral but asymmetric variation, which was extremely rare and had clinical importance.

Ozgur *et al*. [13] classified aberrant muscle into digastric fossa and crossover type whether it cross the median line. They reported that digastric fossa type was more common and this type was usually bilateral. One or two anomalous bundles were frequently found, and bilateral four aberrant bundles were also present. In crossover type, only unilateral one, two, or three bundles were found. Present case did not match any previous classification or criteria. Remarkably, this pattern of AB has not been reported in Korean population [11,14].

In the present report, we described a unique form of the digastric muscle in Korean populations. Variations of AB of the digastric muscle can be easily confused with pathological conditions in CT and MR

imaging [15,16]. The presentation of this unique variation will guide clinicians during surgical interventions and radiological diagnosis.

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